

Study Guide

Student Edition
Pages 291–297**Parallelograms**

Any four-sided polygon is called a **quadrilateral**. A segment joining any two nonconsecutive vertices in a quadrilateral is called a **diagonal**. A special kind of quadrilateral in which both pairs of opposite sides are parallel is called a **parallelogram**.

The following theorems all concern parallelograms.

- Opposite sides of a parallelogram are congruent.
- Opposite angles of a parallelogram are congruent.
- Consecutive angles in a parallelogram are supplementary.
- The diagonals of a parallelogram bisect each other.

Example: If the quadrilateral in the figure is a parallelogram, find the values of x , y , and z .

Since opposite angles of a parallelogram are congruent, $x = 72$.

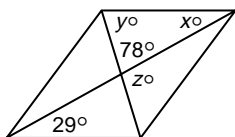
Since consecutive angles of a parallelogram are supplementary, $y + 72 = 180$. Therefore, $y = 108$.

Since opposite sides of a parallelogram are congruent, $z = 8$.

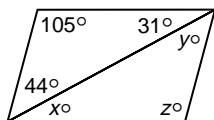


If each quadrilateral is a parallelogram, find the values of x , y , and z .

1.



2.



3.

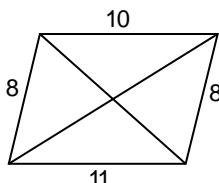


4. In parallelogram $ABCD$, $m\angle A = 3x$ and $m\angle B = 4x + 40$. Find the measure of angles A , B , C , and D .

5. In parallelogram $RSTV$, diagonals \overline{RT} and \overline{VS} intersect at Q . If $RQ = 5x + 1$ and $QT = 3x + 15$, find QT .

Explain why it is impossible for each figure to be a parallelogram.

6.



7.

